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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MCHENRY, KEVIN L

ART UNIT

PAPER NUMBER

1725

5

DATE MAILED: 07/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/043,728	Applicant(s) AUSTEN ET AL.	
	Examiner Kevin L McHenry	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**.
- 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8 is/are allowed.
- 6) ☒ Claim(s) 1-5 and 9-30 is/are rejected.
- 7) ☒ Claim(s) 6 and 7 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-5, 9-23, and 27-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 1 recites the limitation "the beginning" in line 8 of page 23. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a beginning".
4. Claim 1 recites the limitation "the process settings" in line 10 of page 23. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "process settings".
5. Claim 3 recites the limitation "the temperature set points" in lines 16-17 of page 23. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "temperature set points".
6. Claim 4 recites the limitation "the thermal mass" in lines 21-22 of page 23. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a thermal mass".
7. Claim 4 recites the limitation "the cold component" in line 22 of page 23. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a cold component".

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8. Claim 4 recites the limitation "the board thickness" in line 22 of page 23. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a board thickness".

9. Claim 9 recites the limitation "the temperature set points" in lines 13-14 of page 24. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "temperature set points".

10. Claim 10 recites the limitation "the ideal profile" in lines 18-19 of page 24. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "an ideal profile".

11. Claim 11 recites the limitation "the temperature set points" in line 22 of page 24. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "temperature set points".

12. Claim 12 recites the limitation "the temperature set points" in lines 27-28 of page 24. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "temperature set points".

13. Claim 13 recites the limitation "the conveyor speed" in lines 30-31 of page 24. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a conveyor speed".

14. Claim 14 recites the limitation "the linear distance" in line 3 of page 25. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a linear distance".

15. Claim 15 recites the limitation "the beginning" in line 6 of page 25. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a beginning".

16. Claim 16 recites the limitation "the solder paste specification limits" in lines 9-10 of page 25. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "solder paste specification limits".

17. Claim 17 recites the limitation "the temperature set points" in line 14 of page 25. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "temperature set points".

18. Claim 18 recites the limitation "the solder paste specifications" in lines 21-22 of page 25. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "solder paste specifications".

19. Claim 18 recites the limitation "the beginning" in lines 23-24 of page 25. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a beginning".

20. Claim 18 recites the limitation "the forward end" in line 24 of page 25. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a forward end".

21. Claim 21 recites the limitation "the temperature" in lines 1-2 of page 26. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "a temperature".

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22. Claim 22 recites the limitation "the temperature settings" in lines 5-6 of page 26.

There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "temperature settings".

23. Claim 27 recites the limitation "the set points" in lines 26-27 of page 26. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "set points".

24. Claim 29 recites the limitation "the temperature settings" in line 7 of page 27. There is insufficient antecedent basis for this limitation in the claim. For examination purposes the examiner interpreted this language to mean "temperature settings".

Claim Rejections - 35 USC § 103

25. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

26. Claims 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazmierowicz, "The Science Behind Conveyor Oven Thermal Profiling".

Kazmierowicz teaches a computer that interfaces with a multiple zone conveyor oven so that the computer can analyze the temperature profile of the oven and then generates a desired profile for the oven. After a desired profile is displayed the setpoints of the oven are adjusted. Kazmierowicz teaches that soldering processes can have a preheat phase, a soak phase, and a reflow phase. The computer has a monitor that can

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be used to display information and interface with the control program and a keyboard for inputting information and that would permit adjustment of the desired profile. (see Kazmierowicz, "The Science Behind Conveyor Oven Thermal Profiling"; particularly pages 1-3, 7, and 9-13).

Kazmierowicz does not teach that the desired profile is generated from the basis of an ideal temperature. Nor does Kazmierowicz teach that the oven set points are adjusted automatically.

It would have been obvious to one of ordinary skill in the art at the time that the applicant's invention was made that desired temperature taught by Kazmierowicz would be calculated upon the basis of an ideal temperature. As Kazmierowicz notes on page 13, the oven's setpoint profile does not accurately match the actual profile of the oven. Therefore, a mismatch normally exists between the real profile and an ideal profile that is calculated. To compensate for this different, one of ordinary skill would adjust the setpoint profile in order to produce an actual profile that more closely matched an ideal profile. One of ordinary skill in the art would also automate the adjustment of oven set points in order to decrease the amount of labor used and increase the productivity of a solder reflow operation.

Allowable Subject Matter

27. Claim 8 is allowed.
28. Claims 6 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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29. Claims 1, 18, and 29 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

30. Claims 2-5, 9-17, 19-23, and 30 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

31. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not teach or suggest a process for controlling a multiple zone conveyor oven for a heating process in which a part is conveyed through the oven and the process has multiple phases, wherein a target temperature profile is determined for a part by aligning an initial temperature of each phase with the forward end of an oven zone and the temperature settings of each zone are calculated for effecting the target profile.

Nor does the prior art teach or suggest a process for controlling a soldering process in a multiple zone conveyor oven by determining an oven zone coefficient for each heating zone, selecting a solder paste for reflow with the paste having an ideal temperature profile, and generating a target profile for the oven by adjusting the ideal profile to fit the oven zones.

Nor does the prior art teach or suggest an apparatus for controlling a soldering process in a multiple zone conveyor oven with multiple phases, wherein the apparatus includes a means for providing an ideal temperature profile that is derived from specifications for the solder paste that is to be reflowed and a means for generating a target profile for the process so that the beginning of each phase coincides with the beginning of a zone.

Conclusion

32. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mishina et al. (U.S.P. 5,203,487), Teshima et al. (U.S.P. 5,413,164), Marcantonio (U.S.P. 5,562,243), Berkin (U.S.P. 6,168,064), Lee et al. (U.S.P. 6,352,192), Richert et al. (U.S.P. 6,495,800), and Schultz et al. (U.S.P. 6,560,514) are cited of interest for illustrating the state of the art in processes and means for computing and controlling a solder reflow process.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin L McHenry whose telephone number is (703) 305-9626. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G Dunn can be reached on (703) 308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



July 25, 2003



M. ALEXANDRA ELVE
PRIMARY EXAMINER